

Abstract

To effectively prevent a micro arc causing damage to an apparatus and a substrate, by detecting a generation of the micro arc. A substrate processing apparatus is constituted so as to generate a plasma P, by applying a high frequency power to an electrode 210 provided in a processing chamber 200 from a high frequency power supply part 100 through a matching unit 300. A directional coupler 121 is provided between a high frequency power source 111 and the matching unit 300, so that a reflected wave reflected from the electrode 210 and a traveling wave advancing toward the electrode 210 are coupled to a detector 122. The detector 122 outputs a detection signal, when a level of a reflected wave P_r and a differential level thereof exceed each set value. In order to place an initial period of discharge out of a detection period, a delay traveling wave, which is a delayed traveling wave, is also outputted. A controller 130 determines the generation of a harmful micro arc, when coincidence of three detection signals outputted from the detector 122 is obtained, supplies an RF cut signal to a CPU 116, and temporarily stops or temporarily decreases a high frequency power from the high frequency power source 111.